air barrier
abaa
association of
america

CONTINUING EDUCATION
AIA

Design Considerations for Air Barriers in Deep Energy Retrofits

ABAA 115-85 Rev 0 issued November 2010

Design Considerations

Air Barrier Association of America (ABAA) is a Registered Provider with The American Institute of Architects Continuing Education Systems. Credit earned on completion of this program will be reported to CES Records for AIA members. Certificates of Completion for non-AIA members are available on request.

This program is registered with the AIA/CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product. Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

CONTINUING EDUCATION AIA

Copyright Materials

air barrier
abaa
association of
america

Design Considerations

Air Barrier Association of America

-PRESENTATION CODE OF ETHICS-

The Representative, when speaking about Air Barrier technology and using language, information, presentations, logos, or any other communication means that could be reasonably likely to cause the recipient(s) of such information to believe that the communication represents an official ABAA technical viewpoint, shall:

- Hold themselves out to the public with professionalism and sound ethics by conducting themselves in a way which reflects positively on ABAA and the ABAA members
- Clearly state their affiliation
- Identify their relationship with ABAA
- Declare that they are presenting an official (unmodified) presentation prepared by ABAA
- Indicate whether the presentation is at the official request of ABAA
- This is an AIA Accredited Presentation
- This presentation will not highlight focus or reference to a specific product of manufacturer

Design Considerations

Learning Objectives

- Identify all the General Design Considerations when incorporating an air barrier in Deep Energy Retrofits
- Relate to the Types of Leaks in our Enclosure System
- Confirm Air Barrier Requirements
- Gain knowledge of Basic Details for continuity

Air Barriers

GENERAL DESIGN CONSIDERATIONS FOR DEEP ENERGY RETROFITS

Design Considerations

Where do you start ?

general considerations

- Type of building
- Expected service life of building
- Climate region
- Intended or resultant interior conditions
- Type of construction

DEEP ENERGY RETROFIT

considerations: durability

MAINTAINING CONTINUITY OF THE AIR BARRIER IS CRITICAL

Material Selection

air barrier

Consider Carefully:

Properties of the air barrier material

Compatibility with other BE components

Adhesion / fastening to substrate

In service loads and stresses

Air Barriers

TYPES OF LEAKS IN THE ENCLOSURE

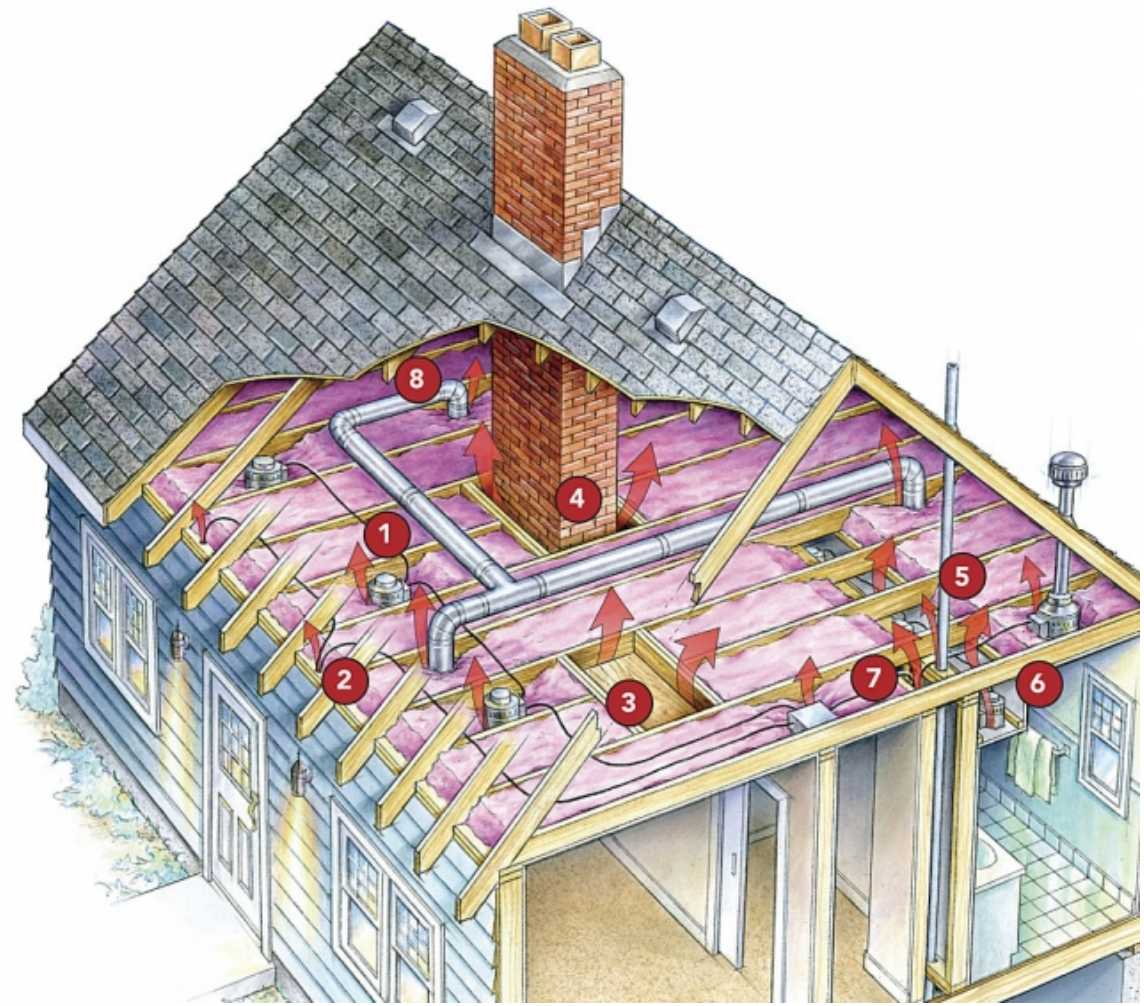
Types of leaks
in the enclosure system

- Air may leak through a building envelope via numerous types of holes, openings or paths.
  - For example, it may infiltrate into an exterior wall at the weep holes of a brick cladding, through the imperfections of the brick ties and into the insulation cavity.
  - It may exit into a room from an electrical outlet or from under the gypsum board finish at the exterior wall.

Types of leaks
in the enclosure system

- Minor Air Leakage Retrofits
- Orifice flow
  - Occurs when the air entry and exit are in a linear pathway, such as in the crack between a window rough opening and its frame

Minor Air leakage Retrofits

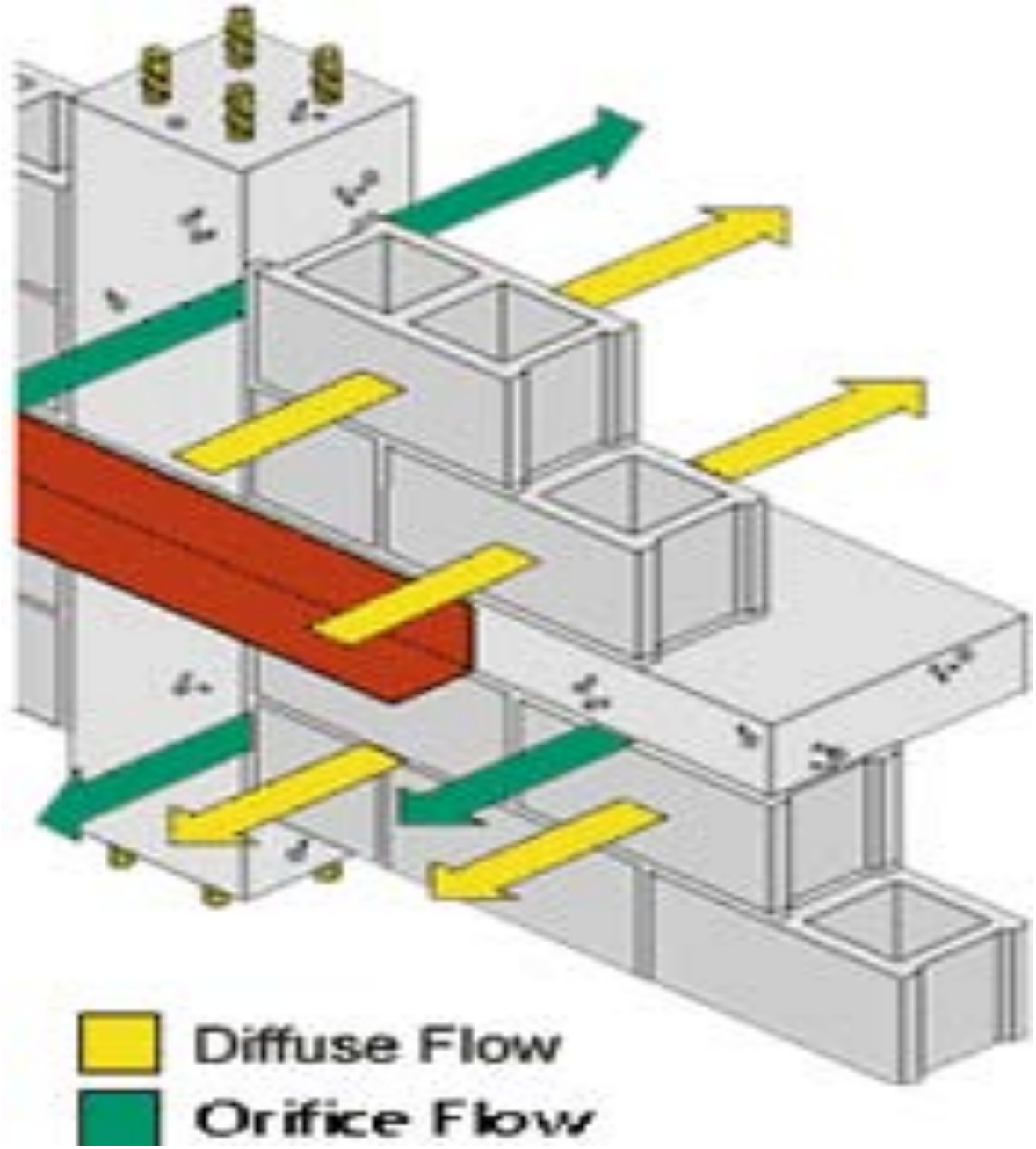


Design Considerations

Minor Air leakage Retrofits

Types of leaks
in the enclosure system

- Diffuse flow
  - Diffuse flow happens when materials are used in the envelope that are ineffective in controlling air infiltration and exfiltration due to many cracks or their high permeance to air, such as fibrous insulation or uncoated concrete block.

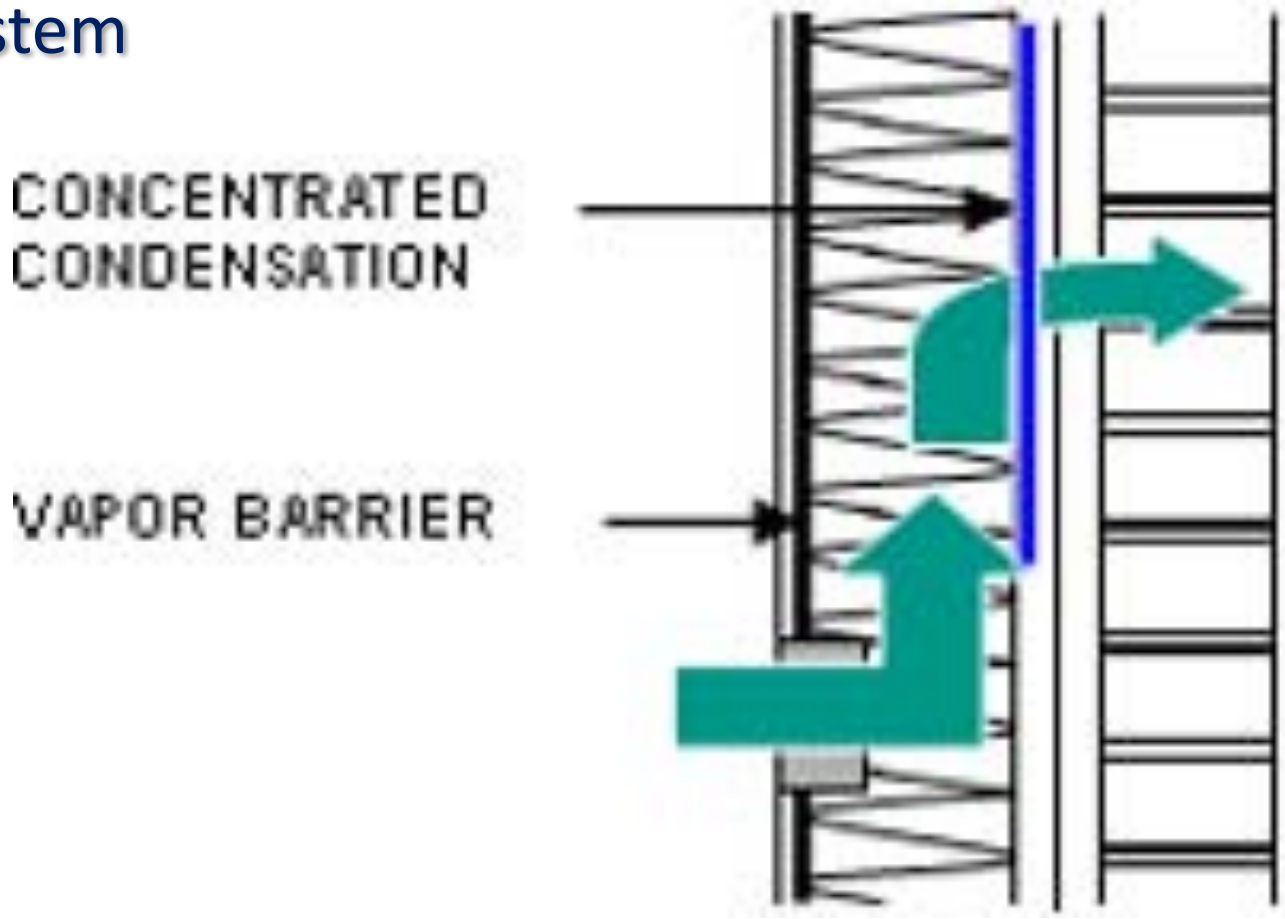

Diffuse Flow
Orifice Flow

Types of leaks
in the enclosure system

- Channel flow
  - Channel flow is probably the most common and serious of all types of air leaks.
  - The air entry point and exit point are distant from each other, giving the air enough time to cool below its dew point and deposit moisture in the building enclosure.

Design Considerations

Types of leaks
in the enclosure system



Air Barrier Requirements

for the air barrier

- A continuous plane of air-tightness must be traced throughout the building envelope with all moving joints made flexible and air-tight

Air Barrier Requirements

for the air barrier

- The air barrier “system” must be able to withstand the maximum positive and negative air pressure to be placed on the building and transfer the load to the structure

Assembly Requirements

for the air barrier

- The concept is to select and target a component of the wall or roof that is air permeable and to deliberately make it an airtight "assembly" by sealing the joints and penetrations.

Design Considerations

Location
for the air barrier

- The air barrier can be located anywhere in the envelope assembly
- If it is located on the cold side, it should be vapor permeable

Design Considerations

Location
for the air barrier

- Exterior Application
- Interior Application

Design Considerations

Location
for the air barrier

- Exterior Application
  - Continuity
  - Thermally protected
  - Durability

Air Barriers

AIR BARRIER MATERIALS

Design Considerations

Air Barrier Materials

- Choose the one that is best suited for your application
- Types are:


Interior

Spray-applied foam


Mechanically fastened


Non-insulating board stock

Insulating board stock


Sealers w/ backup structure


Self-adhered


Fluid-applied non-foaming

Air Barriers

AIR BARRIER SPECIFICATIONS

Air Barrier Specifications

ABAA Air Barrier Master Specifications

•ABAA 072761 SELF-ADHERED SHEET AIR BARRIER SPECIFICATION
•ABAA 072726 FLUID-APPLIED MEMBRANE AIR BARRIER SPECIFICATION
•ABAA 072726 FLUID-APPLIED MEMBRANE AIR BARRIER SPECIFICATIN
•ABAA 072703 CLOSED CELL, MEDIUM-DENSITY SPRAY POLYURETHANE FOAM AIR BARRIER SPECIFICATION
•ABAA 072723 BOARDSTOCK - RIGID CELLULAR THERMAL INSULATION BOARD AIR BARRIER SPECIFICATION
•ABAA 072708 MECHANICALLY ATTACHED FLEXIBLE SHEET AIR BARRIER SPECIFICATION

ABAA Water-Resistive Barrier Master Specification

•ABAA 072707 VAPOR PERMEABLE FLEXIBLE SHEET WATER RESISTIVE BARRIER SPECIFICATION

Air Barrier Specifications

Key Points in the ABAA Specification

- Part 1
  - Coordinate the trades
  - Set performance criteria
    - Material
    - Assembly
    - Provide continuity
    - Only qualified contractors to bid
    - Submittals
    - Mock up testing
    - Pre-Construction meetings

Air Barrier Specifications

Key Points in the ABAA Specification

- Part 2
  - Materials
    - Type of air barrier already chosen
    - Open to all or pre-selected

Air Barrier Specifications

Key Points in the ABAA Specification

- Part
  - Execution
    - Basic requirements for installation
    - Manufacturer's instruction also has to be followed
    - ABAA requirements have to be followed
    - Field quality control

Air Barriers

BASIC DETAILS

Design Considerations

Air Barrier

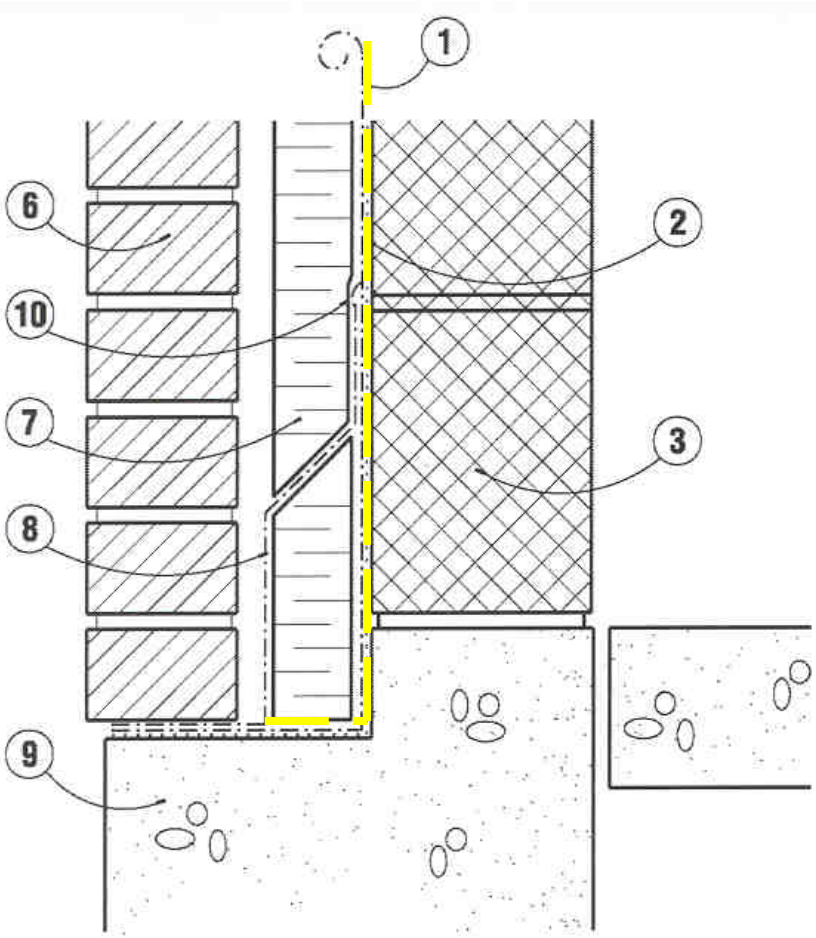
Basic details

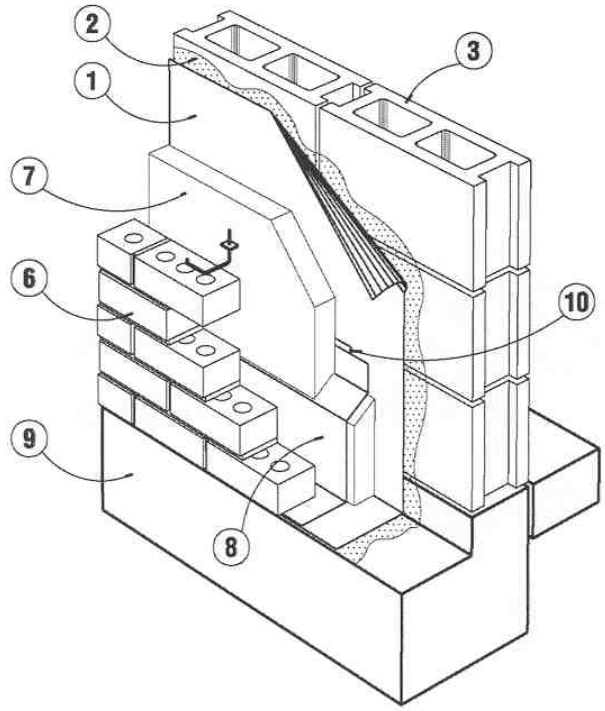
- Continuity Issues
  - Roof / Wall
  - Foundation / Wall
  - Window/Wall
  - Change in substrate
  - Expansion Joints
  - Floor to Floor

Design Considerations

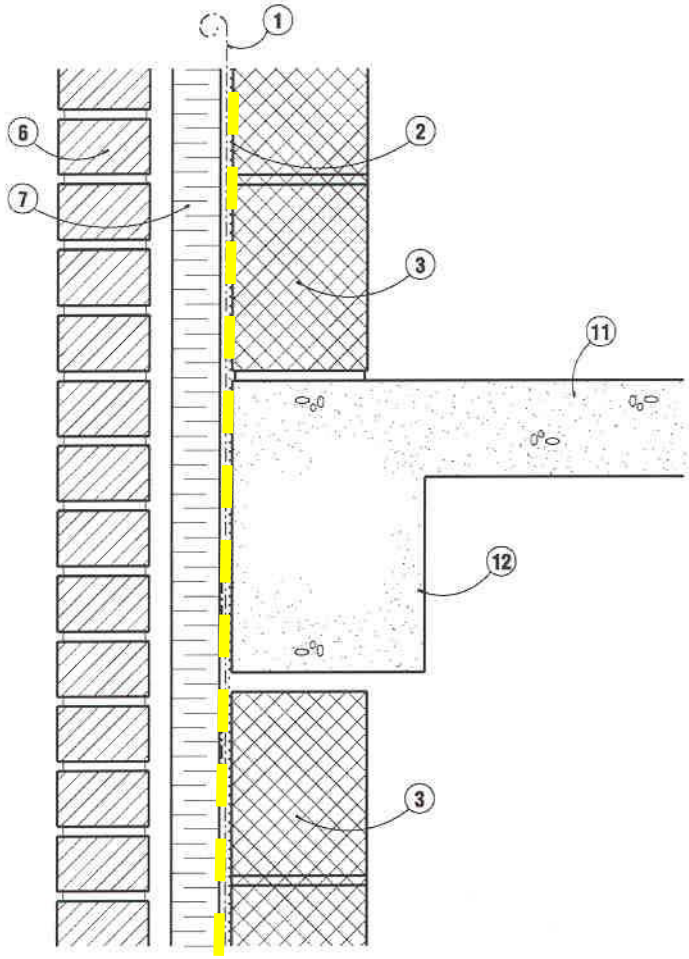
- Review Details
- Case Study

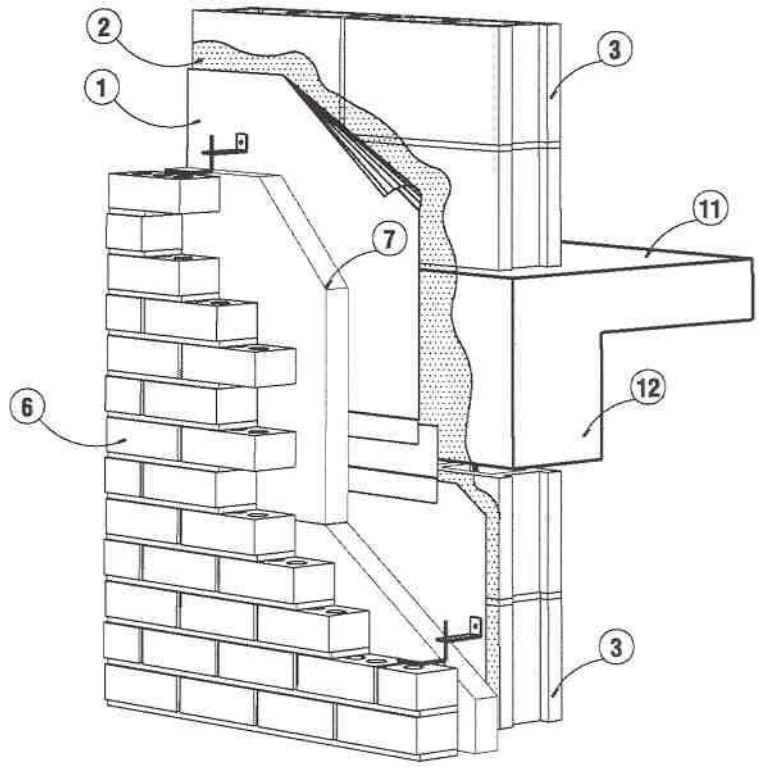
Masonry Wall – Foundation Junction



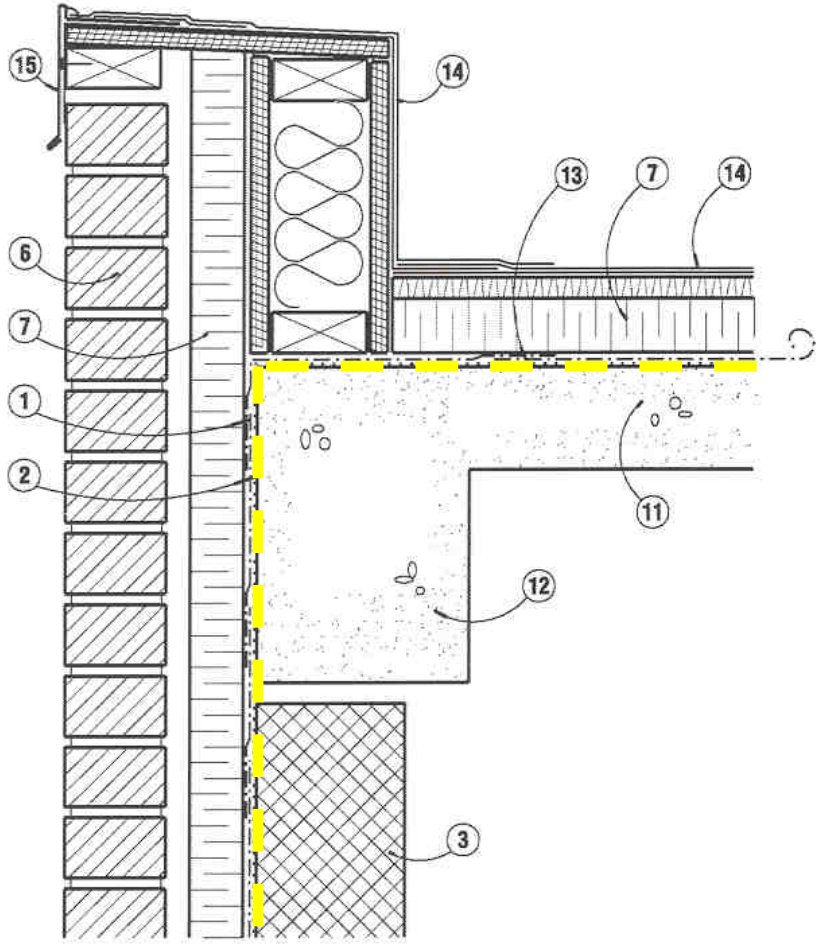


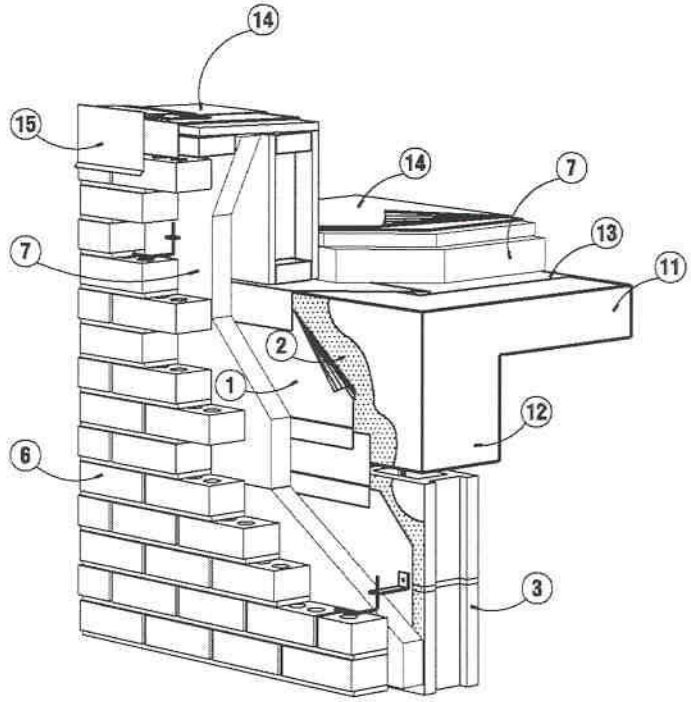
Masonry Wall – Floor Junction



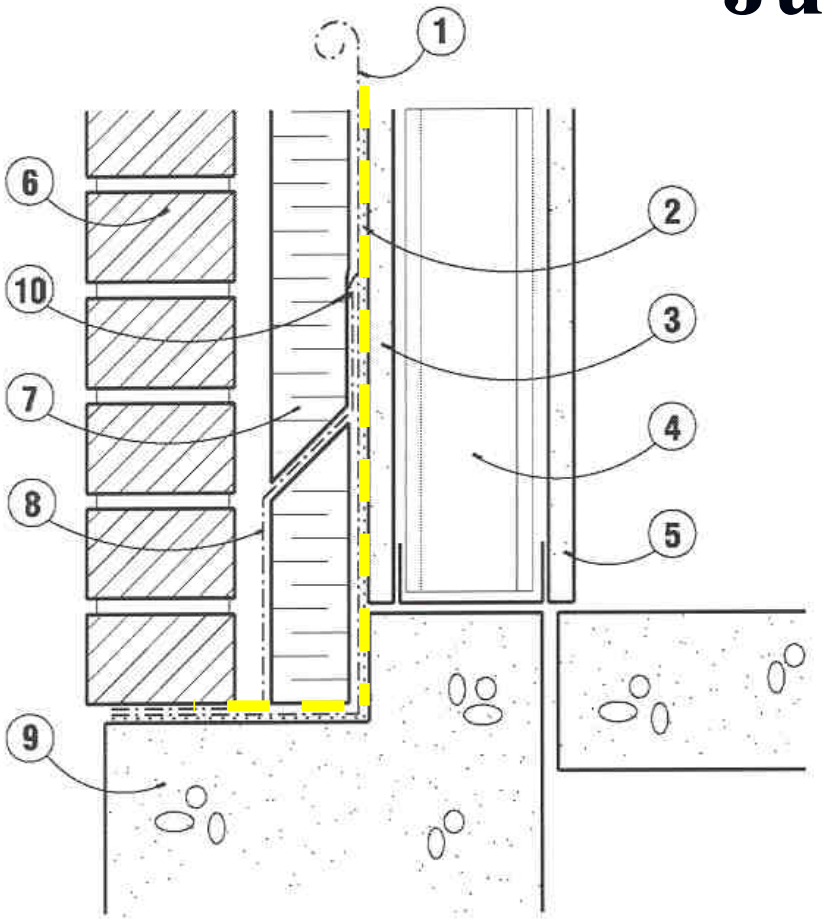


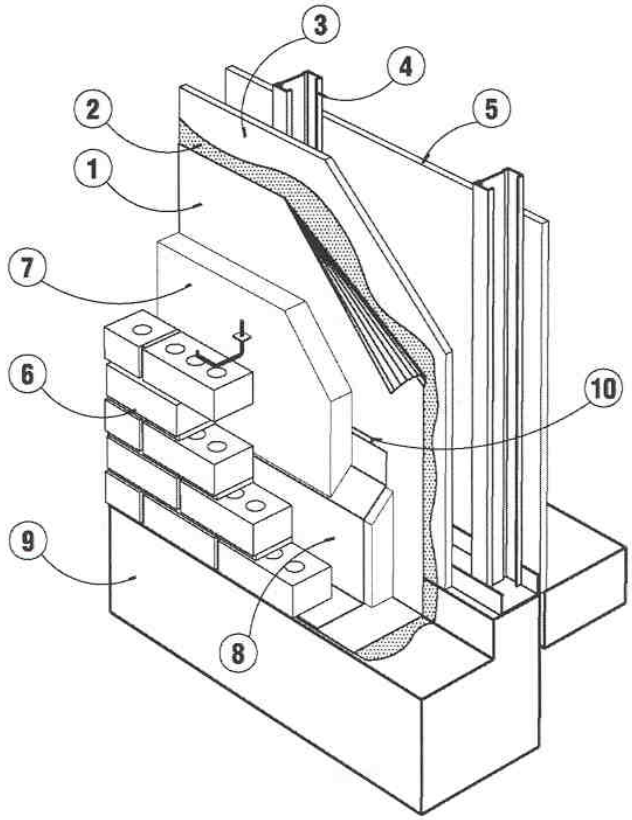
Masonry Wall – Roof Junction



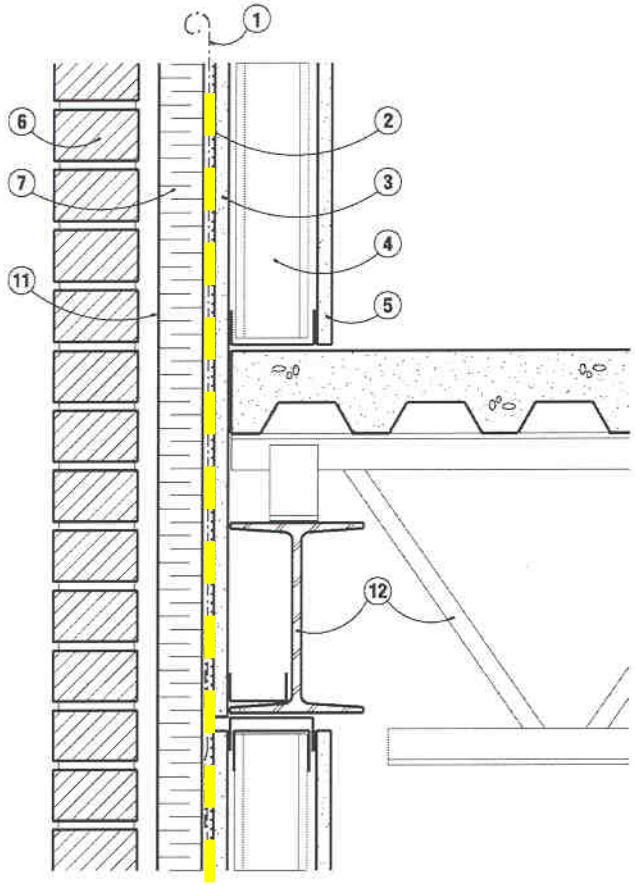


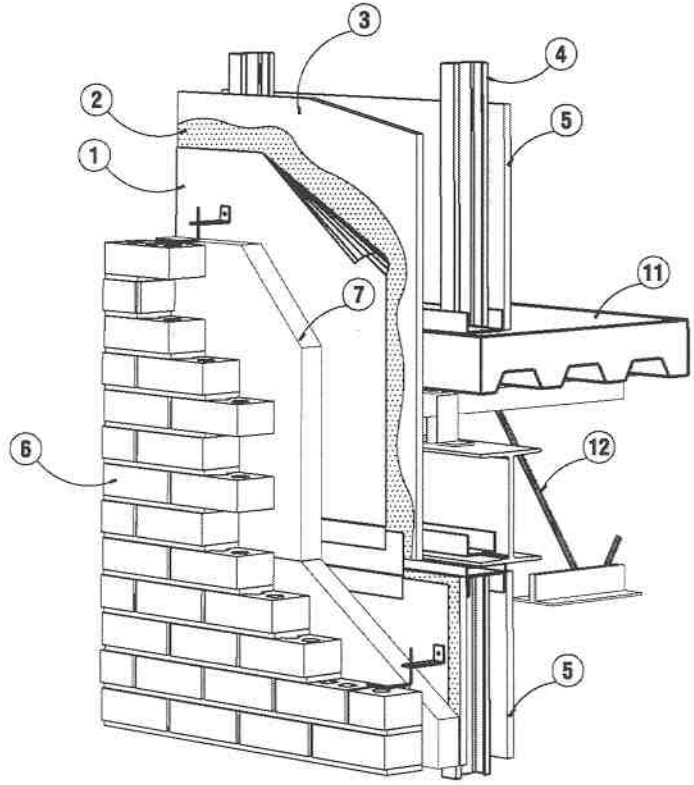
Steel Stud Wall – Foundation Junction



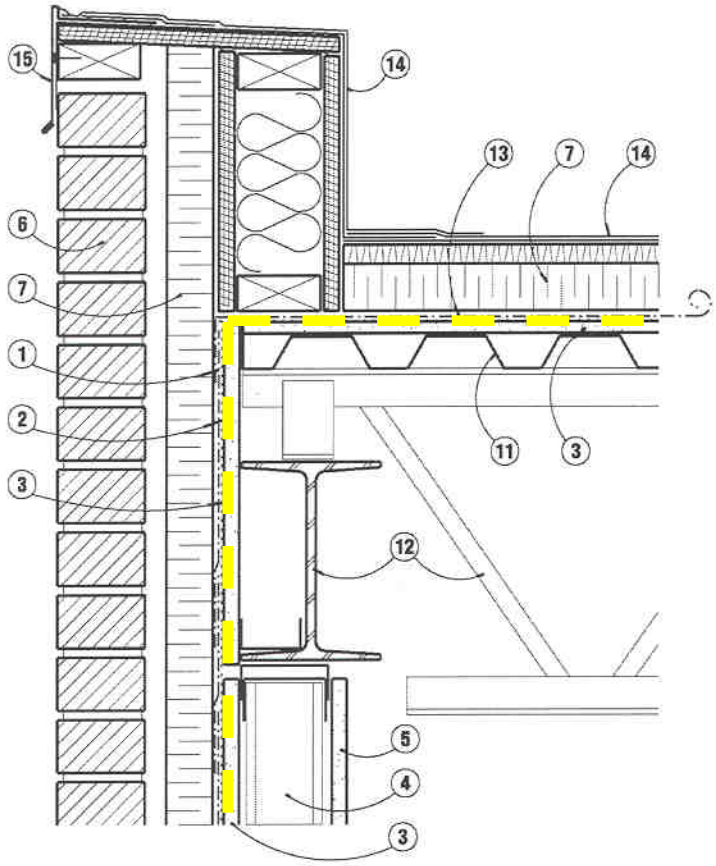


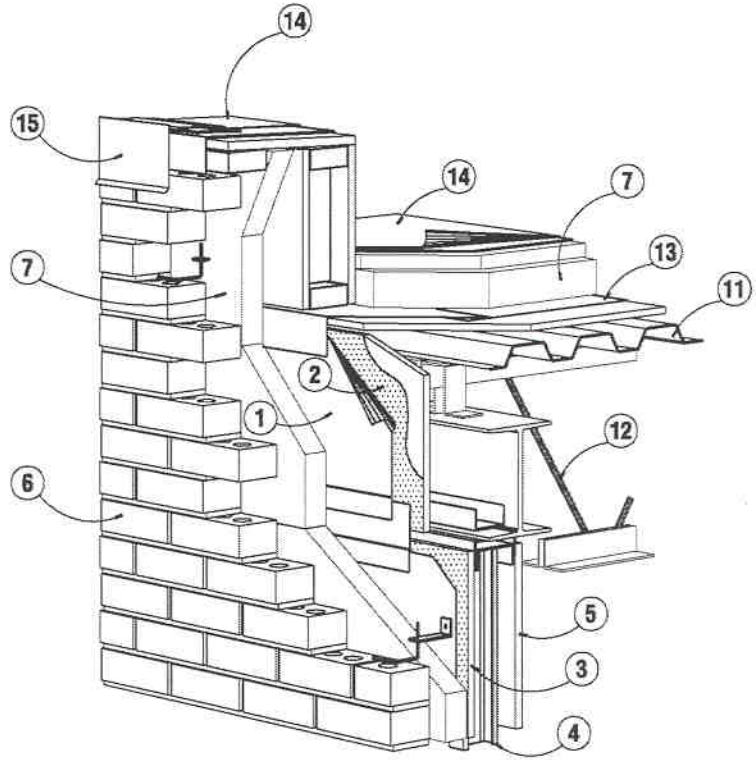
Steel Stud Wall –Floor Junction





Steel Stud Wall – Roof Junction

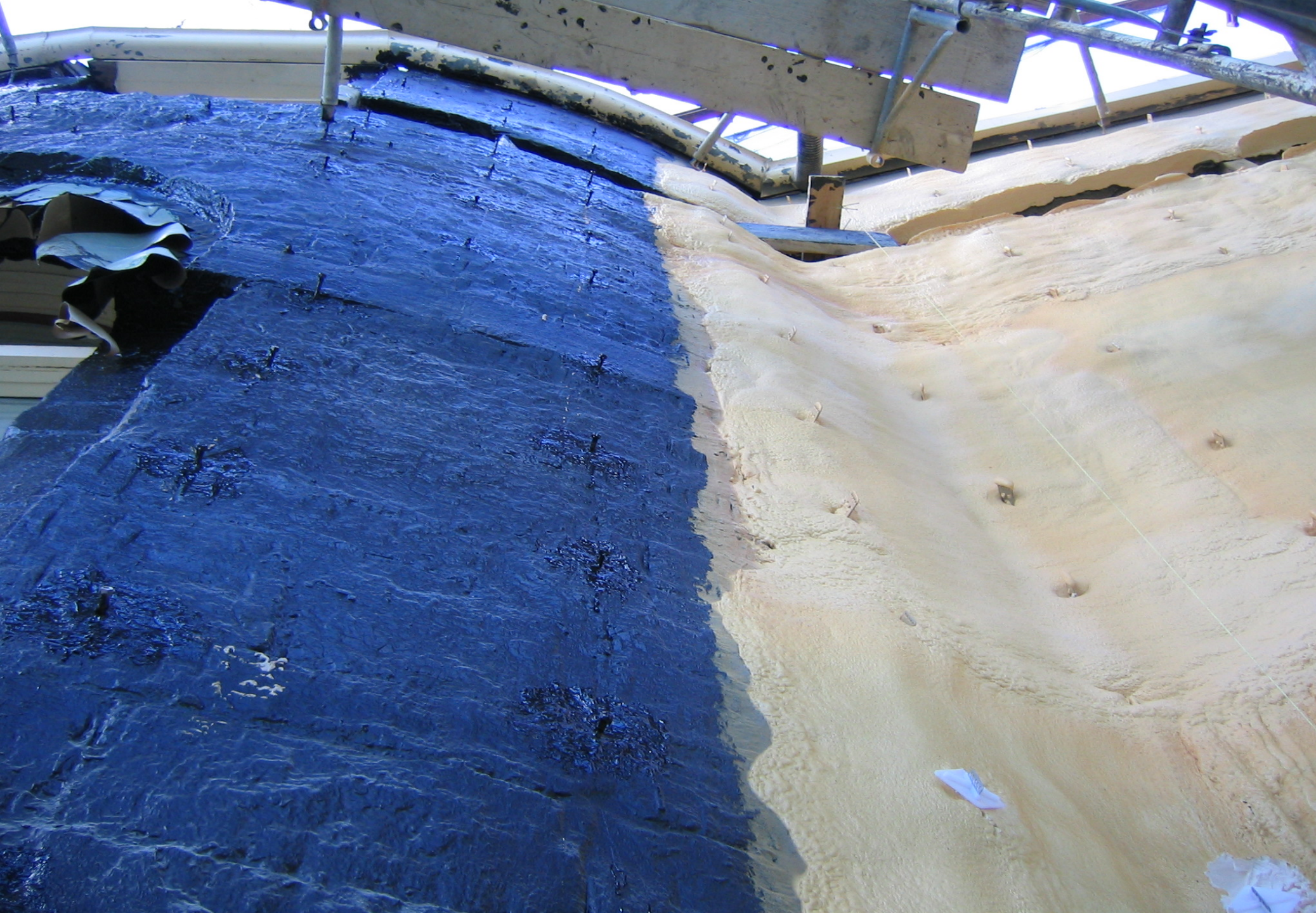




Deep Energy Retrofit of Historic University Building
Case Study


air barrier
abaa
association of
america
National Air Barrier Association
Job Site Report
Project Information
Installation & Testing Location


UNIVERSITY OF WINNIPEG
WESLEY HALL
STONE RECONSTRUCTION
CORBETT CIBINEL ARCHITECTS
WARDROP ENGINEERING INC.
PC ENGINEERING LTD.
A. AKMAN & SON LTD.
THE PROVINCE OF MANITOBA
THE UNIVERSITY
OF WINNIPEG FOUNDATION
AKMAN
Corbett Cibinel



Deep Energy Retrofit of School
Case Study #2


ATCO


Blueskin


Blueskin


National Gypsum
National Gypsum


DOW
TUFF-R
Commercial Insulation


Nail every 16 inches
Use line as guide
BOARD


BOARD
PACTIV
Building Products
WARNING: Foam plastic insulation will ignite if exp
shipment, storage, and installation.

Design Considerations

Air Barrier

specifications

- Please review and consult your Deep Energy Guide for further details and Design Considerations

Additional Air Barrier

resources

- Details, Guide:
  - Board of Building Regulations and Standards
    Commonwealth of Massachusetts
    www.state.ma.us/bbrs/energy.htm
    Whole Building Design Guide
    www.wbdg.org
  - Specifications, Contractors
    and Quality Assurance Help
    - Air Barrier Association of America
      www.airbarrier.org

Design Considerations

air barrier
abaa
association of
america

Thank you for your time!

QUESTIONS??

This concludes The American Institute of Architects Continuing Education Systems Program

air barrier
abaa
association of
america

1600 Boston-Providence Hwy

Walpole, MA 02081 USA

www.airbarrier.org